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D. R. SMITH ET AL

3,606,876

HEAT EXCHANGER CELL FOR GAS-FIRED FURNACE

Filed May 7, 1970

2 Sheets-Sheet 1

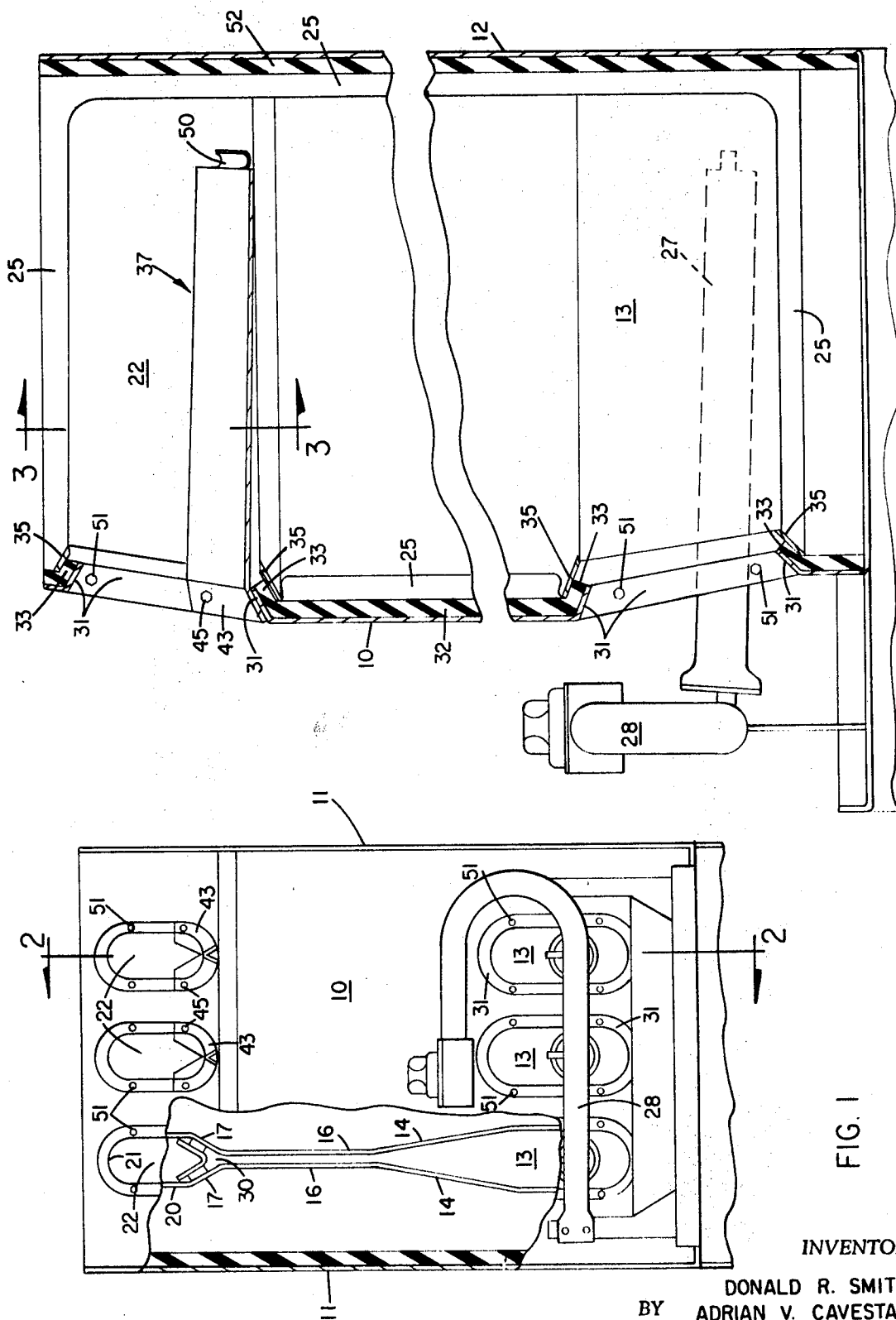


FIG. 2

FIG. 1

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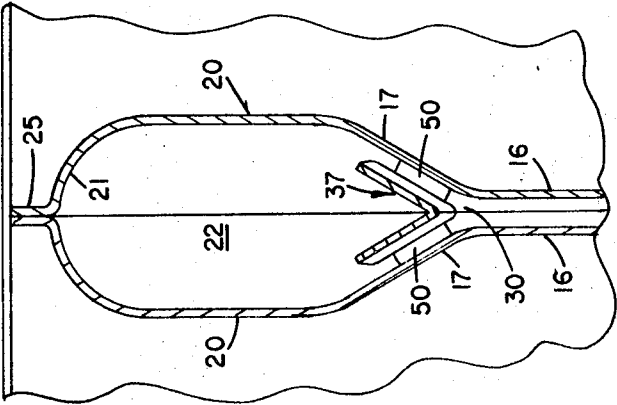


FIG. 3

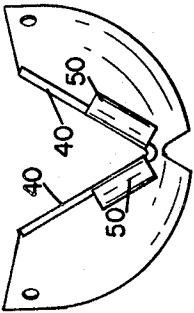


FIG. 6

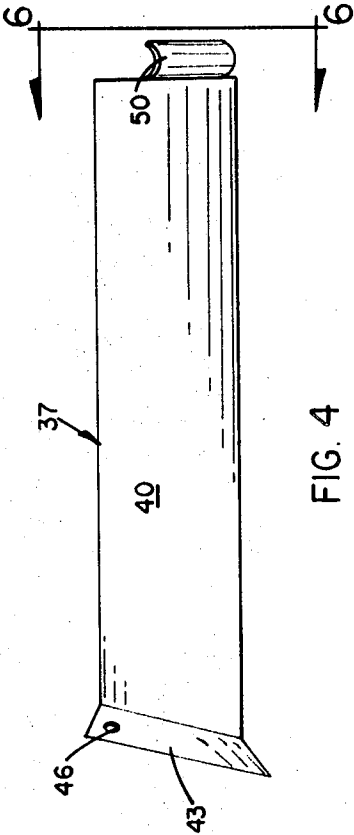


FIG. 4

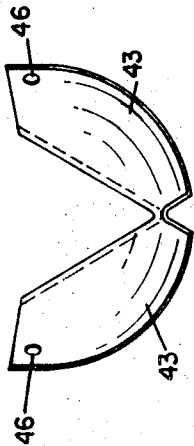


FIG. 5

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HEAT EXCHANGER CELL FOR GAS-FIRED FURNACE

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6 Claims

ABSTRACT OF THE DISCLOSURE

The discharge chamber of the heat exchanger cell has an inlet slot extending lengthwise of the chamber which has an open discharge end. A trough-shaped baffle extends above the slot with the apex of the baffle in proximity to the slot, the baffle being positioned medial of the side walls of the chamber. One end of the baffle is fixed at the open end of the chamber. The sides of the baffle at the opposite end thereof are provided with arcuate tabs which yieldingly engage the side walls of the chamber. Such frictional engagement maintains the baffle in proper position and permits expansion and contraction of the baffle relative to the discharge chamber of the cell.

BACKGROUND OF THE INVENTION

The advantages of the use of baffles in flue-gas passages of gas-fired heating apparatus are well known. However, problems are encountered in properly mounting the baffles in the passages. The baffles are subject to vibration caused by variations in the gas flow. Such vibration often creates an objectionable noise of substantial magnitude. Also, the baffles, due to expansion and contraction, produce an objectionable ticking noise. One attempt to eliminate vibration noise is to employ inorganic fibrous material with the view of absorbing the vibration and sound waves resulting therefrom. Such treatment has not been entirely satisfactory and has added appreciably to the cost of the unit.

SUMMARY OF THE INVENTION

Our invention is directed to a heat exchanger cell for a gas-fired furnace in which the baffle mounted in the discharge chamber of the cell is fixedly secured therein at one end, and the opposite end of the baffle is provided with arcuate tabs which frictionally engage the side walls of the discharge chamber to maintain the baffle in proper position during operation of the furnace and to render noise due to expansion and contraction of the baffle relative to the heat exchanger cell negligible.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view with parts broken away and parts in section, illustrating a gas-fired furnace employing heat exchanger cells of our invention;

FIG. 2 is a view taken on line 2—2 of FIG. 1;

FIG. 3 is a view taken on line 3—3 of FIG. 2;

FIG. 4 is a side elevational view of the baffle;

FIG. 5 is an end elevational view looking to the right in FIG. 4; and

FIG. 6 is an end elevational view looking to the left in FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The furnace shown in FIGS. 1 and 2 includes a casing having a front wall 10, side walls 11, and a rear wall 12. A number of heat exchanger cells are vertically disposed in the upper portion of the casing. The heat exchanger cells are each formed in the lower portion thereof with a burner

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chamber 13, the side walls of which converge as at 14 and merge with closely spaced-apart walls 16 which, at their upper ends, diverge as at 17. The diverging portions 17 merge with upwardly extending walls 20 connected to a curved top wall 21 (see FIG. 3). The wall portions 17, 20, and 21 form a flue gas discharge chamber 22.

The sides of the heat exchanger cell are formed of complementary mating sections having flanges 25 extending about the periphery of the cell, the flanges being fixedly secured together as by welding or the like.

The burner chamber 13 and the discharge chamber 22 are formed with open ends affixed to the front plate 10. The sides of the cells, at the joinder of the portions 16, 17, form an entrance slot 30. A gas burner 27 is mounted in the burner chamber 13 of each heat exchanger cell. As shown in FIGS. 1 and 2, the burners are supplied with gas by a manifold 28. It will be apparent that the flue gases, containing the products of combustion, move upwardly between the wall portions 16 of the heat exchanger cell and enter the discharge chambers 22 through slot 30.

The front plate 10 is formed with upper and lower obround openings complementary to the obround cross-sectional configuration of the burner chambers 13 and discharge chambers 22 of the heat cells. The marginal portion of the front wall about each of the openings is formed with an inwardly extending flange 31. These flanges converge toward the center of the openings at an angle of approximately 45 degrees. A layer of insulating material 32 is positioned on the inner side of the front plate 10 and is formed with apertures in registration with the openings in the front plate 10. Also, the insulating material 32 is formed with inwardly converging flanges 33 (see FIG. 2). Each heat exchanger cell is formed with diverging flanges 35 surrounding the open ends of the chambers 13 and 22. These flanges 35 are positioned against the flanges 33 of the insulating material.

A baffle, indicated generally at 37, is mounted in each of the flue gas discharge chambers 22. These baffles are of trough-like form. As shown in FIGS. 5 and 6, the baffles are V-shaped having upwardly diverging sides 40.

At its outer or forward end, each baffle 37 is formed with a diverging flange or collar 43 formed integral with the side walls 40. The flanges 43 extend at an angle complementary to the flanges 31 of the front plate 10.

The baffles 37 are inserted in the discharge chambers 22 and are fixed in place by screws 45 extending through apertures 46 formed in the flanges 43. The screws 45 extend through the apertures formed in the flanges 31 of the face plate 10 and also extend through the flanges 33 of the insulating material 32 and are threaded into the flanges 35 of the heat exchanger cell.

The side walls 40 of the baffles are formed at their inner ends with arcuate-shaped tabs 50 which frictionally engage the wall portions 17 of the discharge chamber. The formation of the collars 43 is such that when the baffle is affixed to the front plate 10 by the screws 45, it inclines downwardly and inwardly as shown in FIG. 2. With this mounting and the dimensional formation of the tabs 50, the latter are yieldingly pressed against the side wall portions 17. Accordingly, the baffles are retained in the discharge chambers against any movement or vibration. However, it will be apparent that expansion and contraction between the baffles and the side walls of the discharge chambers is permitted. Nevertheless, such expansion and contraction does not cause any discernible noise.

It is obvious that the baffles 37 are economically produced in view of the fact that they consist of a simple sheet metal stamping and, also, that the baffles are conveniently installed during assembly of the furnace, the screws 45 also serving to affix the heat exchanger cells to the front plate 10 in the same fashion as the screws 51

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attach the lower portion of the heat cell to the front plate 10. Insulation 52 is applied on the inner surfaces of the side walls and rear walls of the cabinet.

We claim:

1. A vertically disposed heat exchanger cell structure for gas-fired furnaces and the like, said cell being formed in the lower portion thereof with a burner chamber and being formed in the upper portion with a horizontally disposed elongated flue gas discharge chamber, said chamber being formed with an open discharge end and with a flue gas entrance slot extending lengthwise thereof and having communication with said burner chamber, said discharge chamber having side walls diverging upwardly from said slot and merging with a top wall, a trough-shaped baffle positioned in said chamber medial of the side walls thereof and extending in a direction lengthwise thereof from said open end, the bottom of said baffle extending above said slot proximate thereto, the sides of said baffle extending in inwardly spaced relation to the diverging side walls of said chamber, one end of said baffle being fixedly secured at the open end of said chamber, the sides of said baffle at the opposite end thereof being provided with laterally extending tabs frictionally engaging the side walls of said chamber, whereby said baffle may expand and contract relative to said chamber.

2. A heat exchanger cell as set forth in claim 1 wherein said baffle is of V formation.

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3. A heat exchanger cell as set forth in claim 1 wherein said tabs are formed integral with the sides of said baffle.

4. A heat exchanger cell as set forth in claim 1 wherein said tabs are of arcuate form.

5. A heat exchanger cell as set forth in claim 1 wherein the sides of said baffle terminate in downwardly spaced relation to the top wall of said chamber.

6. A heat exchanger cell as set forth in claim 1 including means operable to fix said one end of said baffle to the open end of said chamber and urge the opposite end of said baffle toward said slot whereby said tabs are yieldingly pressed against the side walls of said chamber.

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